

Lab 1 - Static Routes

Lab 1: IP routing protocol lab—Static routes

The physical topology is as shown in Figure 15–1.

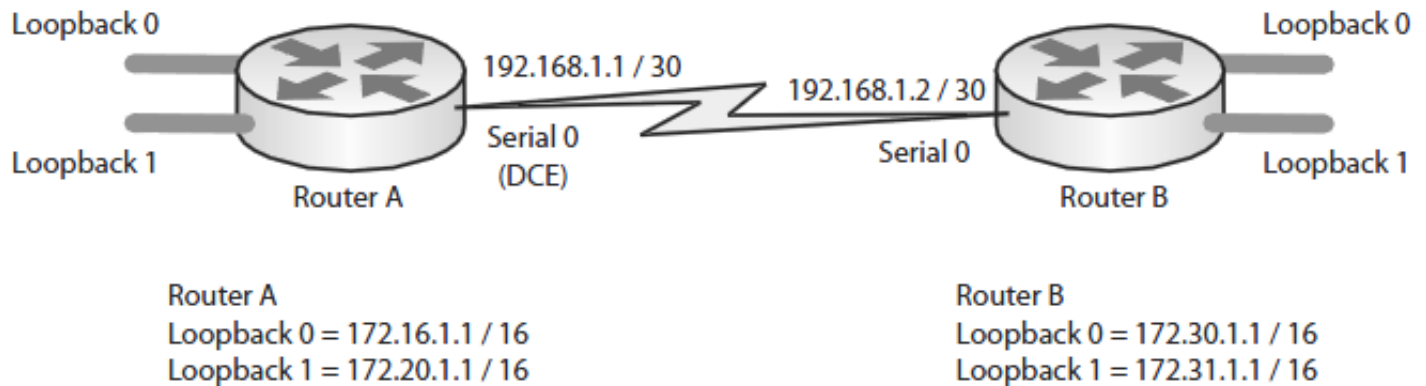


Figure 15–1: Static routes

Lab exercise

Your task is to configure the network in Figure 15–1 to allow full connectivity using the static routes. Please feel free to try the lab without following the lab walk-through section.

Text printed in a monospaced font indicates commands that can be entered on the router.

Purpose

The majority of small businesses have just one router that connects to another router provided by the service provider. These routers will only need to be configured with a very basic config including IP addresses and a static route to reach the ISP. This lab will show you just how to do that.

Lab objectives

1. Use the IP addressing scheme depicted in Figure 15–1. Router A needs to have a clock rate on interface serial 0: set this to 64000.
2. Set telnet access for the router to use the local login permissions of username "banbury" and the password "ccna".
3. Configure the "enable password" to be "cisco". Configure the static routes to provide connectivity to all networks attached to the neighboring router, except the network used for the serial connection.
4. Ensure routing information is correct by checking the routing table for entries to your neighbor's networks.
5. Finally, try to ping all loopback interfaces of your neighbor, and then try to access your neighbor router via telnet.

Lab walk-through

1. To set the IP addresses on an interface, you will need to do the following:

```
Router#config t
Router(config)#hostname RouterA
RouterA(config)#interface serial 0
RouterA(config-if)#ip address 192.168.1.1 255.255.255.252
RouterA(config-if)#clock rate 64000
RouterA(config-if)#no shutdown
RouterA(config-if)#interface loopback 0
RouterA(config-if)#ip address 172.16.1.1 255.255.0.0
RouterA(config-if)#interface loopback 1
RouterA(config-if)#ip address 172.20.1.1 255.255.0.0
RouterA(config-if)# ^ Z
RouterA#
```

To set the clock rate on a serial interface (DCE connection only), you need to use the “clock rate #” command on the serial interface, where # indicates the speed:

```
RouterA(config-if)#clock rate 64000
```

2. To set telnet access, you need to configure the VTY lines to allow telnet access. To do this, type (from configuration mode):

```
RouterA(config)#line vty 0 4 « Enters the VTY line configuration
RouterA(config-line)#login local « This will use local usernames
                        and passwords for telnet access
RouterA(config-line)#exit « Exit the VTY config mode
RouterA(config)#username banbury password ccna « Creates username
                        and password for telnet access (login local)
```

3. To set the “enable password,” do the following:

```
RouterA(config)#enable secret cisco « Sets the “enable password” (encrypted)
```

4. To configure static routes on a router, there is only one step:

```
RouterA(config)#ip route 172.30.0.0 255.255.0.0 192.168.1.2
RouterA(config)#ip route 172.31.0.0 255.255.0.0 192.168.1.2
```

The above command will configure a static route on router A. To get to the destination network of 172.30.0.0 and 172.31.0.0, use the next hop of 192.168.1.2. Instead of

using the above commands, you can enter the ones below. This time the router is told to use an exit interface instead of a next hop. **DO NOT USE BOTH THE ABOVE AND BELOW TOGETHER.**

```
RouterA(config)#ip route 172.30.0.0 255.255.0.0 serial 0
```

```
RouterA(config)#ip route 172.31.0.0 255.255.0.0 serial 0
```

5. Next, we configure the same commands on router B.

Set the IP addresses:

```
Router#config t
```

```
Router(config)#hostname RouterB
```

```
RouterB(config)#interface serial 0
```

```
RouterB(config-if)#ip address 192.168.1.2 255.255.255.252
```

```
RouterB(config-if)#no shutdown
```

```
RouterB(config-if)#interface loopback 0
```

```
RouterB(config-if)#ip address 172.30.1.1 255.255.0.0
```

```
RouterB(config-if)#interface loopback 1
```

```
RouterB(config-if)#ip address 172.31.1.1 255.255.0.0
```

```
RouterB(config-if)# ^Z
```

```
RouterB#
```

Now make sure you can ping across the serial link. If you cannot, then check the configurations again.

```
RouterA#ping 192.168.1.2
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:

```
!!!!
```

Success rate is 100 percent (5/5), round-trip min/avg/max = 28/31/32 ms

Configure telnet access:

```
RouterB(config)#line vty 0 4
```

```
RouterB(config-line)#login local
```

```
RouterB(config-line)#exit
```

```
RouterB(config)#username banbury password ccna
```

Configure the "enable secret password":

```
RouterB(config)#enable secret cisco
```

Set the static route:

```
RouterB(config)#ip route 172.16.0.0 255.255.0.0 192.168.1.1
```

```
RouterB(config)#ip route 172.20.0.0 255.255.0.0 192.168.1.1
```

The above command will configure a static route on router B. To get to the destination network of 172.20.0.0 and 172.16.0.0, use the next hop of 192.168.1.1. Instead of using the above commands, you can enter the ones below. This time the router is told to use an exit interface instead of a next hop. **DO NOT USE BOTH THE ABOVE AND BELOW TOGETHER.**

Router B:

```
RouterB(config)#ip route 172.16.0.0 255.255.0.0 serial 0
```

```
RouterB(config)#ip route 172.20.0.0 255.255.0.0 serial 0
```

This command will configure a static route to the 172.20.0.0 or 172.16.0.0 network, but instead of having a next hop address, we have specified an exit interface to use.

6. Use the "show ip route" command to check that the static routes are in the routing table, and that the next hop address is correct.

```
RouterA#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -

BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 -

OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF

external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter

area * - candidate default, U - per-user static route, o - ODR P -

periodic downloaded static route

Gateway of last resort is not set

```
C 172.16.0.0/16 is directly connected, Loopback0
```

```
C 172.20.0.0/16 is directly connected, Loopback1
```

```
S 172.31.0.0/16 [1/0] via 192.168.1.2
```

```
S 172.30.0.0/16 [1/0] via 192.168.1.2
```

```
192.168.1.0/30 is subnetted, 1 subnets
```

C 192.168.1.0 is directly connected, Serial0

7. To test connectivity, you will need to use the “ping” command. And to logon to your neighbor's router, you need to use the “telnet” command:

RouterA#ping 172.30.1.1 « **This will send a ping packet to the address specified; there should be five replies if everything is OK**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.30.1.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent(5/5),round-trip min/avg/max = 1/2/4 ms

RouterA#

RouterA#ping 172.31.1.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.31.1.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/32 ms

RouterA#

RouterA#telnet 172.30.1.1 « **This will open a telnet connection to your neighbor's router. If telnet access has been set up correctly, you should be presented with a login message. Type “exit” to quit a telnet session.**

RouterA#telnet 172.30.1.1

Trying 172.30.1.1 ... Open

User Access Verification

Username: banbury

Password: « **Password will not show as you type it**

RouterB>exit

[Connection to 172.30.1.1 closed by foreign host]

RouterA#

Router B:

Do the same on router B:

RouterB#ping 172.16.1.1

RouterB#ping 172.20.1.1

RouterB#telnet 172.16.1.1

Show runs

RouterA#show run

Building configuration...

Current configuration : 704 bytes

!

version 12.1

no service single-slot-reload-enable

service timestamps debug uptime

service timestamps log uptime

no service password-encryption

!

hostname RouterA

!

username banbury password 0 ccna

!

ip subnet-zero

!

interface Loopback0

ip address 172.16.1.1 255.255.0.0

!

interface Loopback1

ip address 172.20.1.1 255.255.0.0

!

interface Ethernet0

no ip address

shutdown

!

interface Serial0

```
ip address 192.168.1.1 255.255.255.252
clockrate 64000
!
interface Serial1
  no ip address
  shutdown
!
ip classless
ip route 172.30.0.0 255.255.0.0 192.168.1.2
ip route 172.31.0.0 255.255.0.0 192.168.1.2
no ip http server
!
line con 0
line 1 8
line aux 0
line vty 0 4
login local
!
end
```

RouterA#

RouterB# show run

Building configuration...

Current configuration : 678 bytes

```
!
version 12.1
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname RouterB
```

```
!  
username banbury password 0 ccna  
!  
ip subnet-zero  
!  
interface Loopback0  
 ip address 172.30.1.1 255.255.0.0  
!  
interface Loopback1  
 ip address 172.31.1.1 255.255.0.0  
!  
interface Ethernet0  
 no ip address  
 shutdown  
!  
interface Serial0  
 ip address 192.168.1.2 255.255.255.252  
!  
interface Serial1  
 no ip address  
 shutdown  
!  
ip classless  
ip route 172.16.0.0 255.255.0.0 192.168.1.1  
ip route 172.20.0.0 255.255.0.0 192.168.1.1  
no ip http server  
!  
line con 0  
line aux 0  
line vty 0 4  
 login local  
!  
end  
RouterB#
```




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